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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/709,138	04/15/2004	Kei MURAYAMA	040170	3137

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EXAMINER	
BAREFORD, KATHERINE A	

ART UNIT	PAPER NUMBER
1792	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/709,138	MURAYAMA, KEI	
	Examiner	Art Unit	
	Katherine A. Bareford	1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 April 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3,4,7 and 10* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3,4,7 and 10* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on April 18, 2008 has been entered.

As per the request of the RCE submission of April 18, 2008, the after final amendment of March 13, 2008 has been entered and considered. With the entry of that amendment, claims 2, 5, 6, 8, 9, 11 and 12 have been canceled, and claims 1, 3, 4, 7 and 10 are pending for examination.

Claim Rejections - 35 USC § 112

2. The rejection of claims 1, 3, 4, 7 and 10 under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement is withdrawn due to the amendment of March 13, 2008 to remove the cited material.

3. The rejection of claims 1, 3, 4, 7 and 10 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject

matter which applicant regards as the invention is withdrawn due to the amendment of March 13, 2008 to clarify the claim language.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. The rejection of claims 1, 3, 4, 7 and 10 under 35 U.S.C. 103(a) as being unpatentable over Lin et al (US 5167992) in view of the admitted state of the prior art, EP 837 623 (hereinafter '623) and Miller (US 4668533) is withdrawn due to the amendments to the claims of March 13, 2008 providing a new scope to the claim language.

6. Claims 1, 4, 7 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin et al (US 5167992) in view of the admitted state of the prior art and McCormack et al (US 3443988).

Lin teaches a method of electroless plating. Column 1, lines 5-10. A substrate is prepared that has an insulating body and a conductive pattern formed on the insulating body. Column 3, lines 45-55 and column 4, lines 30-50. The substrate is to be used for

microelectronic interconnect substrates or circuit boards (that is, a wiring substrate). Column 3, lines 45-55. A catalytic metal serving as a catalyst of an electroless plating process is adhered onto the insulating body and the conductive pattern. Column 5, lines 35-60. An oxidizing agent, which can oxidize the catalytic metal and make the catalytic metal in an inactive state to the electroless plating is applied to the catalytic metal. Column 5, line 60 through column 6, line 20 and column 7, lines 25-35. It would be applied in a space portion S between the conductive pattern features (as it is shown being applied to the entire surface). Column 5, line 60 through column 6, line 20. Then a metal layer is selectively formed on the conductive pattern by electroless plating. Column 6, lines 20-30.

Claim 4: the adhering of the catalytic metal onto the insulating body and the conductive pattern includes coating an activating solution containing ions of the catalytic metal to deposit the catalytic metal by an oxidation reduction reaction. Column 5, lines 50-60 and column 7, lines 20-25.

Claim 7: the catalytic metal is palladium. Column 5, lines 45-60. The metal formed by electroless plating can be a nickel layer. Column 6, lines 20-40.

Claim 10: the oxidizing agent can be sulfuric acid (H_2SO_4). Column 7, lines 20-30.

Lin teaches all the features of these claims except that (1) the conductive pattern includes electrodes to be used with connection pads, (2) the space portion between the electrodes has a plurality of different values, (3) that the oxidizing agent is coated selectively so that the oxidizing agent is formed selectively on all parts of the space

portion which are smaller than 30 microns, out of the space portion between the electrodes, to prevent short circuits.

The admitted state of the prior art teaches that when forming wiring substrates with conductive patterns, it is well known for the wiring patterns to include electrodes formed of copper which then are overplated to enhance reliability, and the electrodes form connections to the electronic parts. See paragraphs [0002]—[0008] of the specification. It is also well known for the pitch of the copper electrodes on the wiring substrate to be narrowed to 60 microns or less, and that short circuit problems occur when plating with these narrowed spaces present. See paragraphs [0002]-[0008] of the specification. It is also well known for the space portions between the copper electrodes to vary over the substrate. See paragraph [0006] of the specification. It is also well known to desire to form a nickel layer selectively on the copper electrodes by electroless plating. See paragraphs [0002]—[0008] of the specification. This electroless plating provides plating without using solder resist. See paragraphs [0002]—[0008] of the specification.

McCormack teaches that when electroless plating a substrate, it is known to be desired to only coat certain areas of a substrate. Column 1, lines 10-20 and 30-45. McCormack teaches that to provide such selective coating, it is known to first treat the entire substrate (base) with a catalyst material, such as palladium to render the substrate senstitive to the reception of electroless plating. Column 5, lines 30-45. Then a "poison" material that deactivates the catalyst (neutralizes, lowers catalytic activity) is

applied to limited selected areas of the based material, such as by printing or silk screen stenciling. Column 5, lines 30-45 and column 2, lines 15-35. Thereafter, the base is contacted with an electroless metal deposition solution to deposit electroless metal deposition solution to deposit electroless metal on the sensitized areas not coated with the "poison" containing material. Column 5, lines 30-45. The poisons can include sulfur, used in elemental or compound form. column 2, lines 25-35. The poisons can be dissolved in appropriate solvent, such as water, and applied. Column 3, lines 1-10 and 48-50.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to (1) (2) modify Lin to provide that the conductive pattern includes electrodes spaced different distances apart and that these electrodes can be less than 60 microns apart as suggested by the admitted state of the prior art in order to provide a desirable circuit and microelectronic pattern because Lin teaches forming conductive patterns on insulating substrates for circuit and microelectronic usage, and the admitted state of the prior art teaches that conductive patterns on wiring substrates for such purposes conventionally have copper electrodes spaced different distances apart and that the electrodes can be less than 60 microns apart. It further would have been obvious to perform routine experimentation to optimize the distance apart to less than 30 microns apart in at least some cases as the admitted state of the prior art provides that less than 60 microns apart is conventional, and 30 microns is included in the range of less than 60 microns. As to the electrodes being on which connection pads

of an electronic part are connected, the admitted state of the prior art teaches that the electrodes are used to provide connection to the electronic parts, and thus would connect with connecting devices or "pads" on the electronic parts. (3) It further would have been obvious to modify Lin in view of the admitted state of the prior art to apply the oxidizing agent selectively to the non electrode "space" portion, including all the parts of the space portion of less than 30 microns apart, as suggested by McCormack, in order to prevent plating in the unwanted areas between the electrodes, because Lin teaches that it is desired to deactivate catalytic coating on the dielectric surface (i.e. the spaces between conductors) to prevent plating and resulting short circuits and the admitted state of the art teaches that a particular problem which such plating occurs in narrow spaces, which are less than 60 microns apart (which would be inclusive of less than 30 microns apart); and McCormack teaches that a deactivating poison material can desirably be applied specifically to areas where plating is not desired by a selective coating process such as printing. By printing selectively in the areas desired not to have any plating, the amount of material used can beneficially be reduced.

7. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Lin in view of the admitted state of the prior art and McCormack as applied to claims 1, 4, 7 and 10 above, and further in view of Miller (US 4668533).

Lin in view of the admitted state of the prior art and McCormack teaches all the features of this claim except ink jet printing the oxidizing agent.

However, Miller teaches ink jet printing as a well known printing method to apply materials for electroless plating in a selective form, such as sensitizers and activators. Column 2, lines 40-50, column 3, lines 45-60 and column 4, lines 15-30. The substrate can be an active integrated circuit. Column 3, lines 25-35.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Lin in view of the admitted state of the prior art and McCormack to apply the oxidizing agent selectively by ink jet printing as suggested by Miller with an expectation of desirable printing results, as McCormack teaches that selective application of deactivating material can be by printing, and Miller teaches a well known printing method for selective application of materials for electroless plating is by ink jet printing.

8. Claims 1, 4 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zeller (US 4770899) in view of the admitted state of the prior art and McCormack et al (US 3443988).

Zeller teaches a method of electroless plating. Column 1, line 65 through column 2, line 12. A substrate is prepared that has an insulating body and a conductive pattern formed on the insulating body. Column 2, lines 20-50. The substrate is to be used for interconnect integrated circuits (i.e. wiring substrate). Column 1, lines 5-15. A catalytic metal serving as a catalyst of an electroless plating process is adhered onto the insulating body and the conductive pattern. Column 2, lines 50-68. An oxidizing agent,

which can oxidize the catalytic metal and make the catalytic metal in an inactive state to the electroless plating is applied to the catalytic metal. Column 3, lines 1-12 (sodium hydroxide is a known oxidizing agent, and it deactivates the catalytic metal). It would be applied in a space portion S between the conductive pattern features (as it is shown being applied to the entire surface). Column 3, lines 1-12 and figure 3. It is desired to prevent plating on the space portion to prevent shorts. Column 2, lines 8-11 and column 1, lines 55-60. Then a metal layer is selectively formed on the conductive pattern by electroless plating. Column 3, lines 10-25 and figure 4.

Claim 4: the adhering of the catalytic metal onto the insulating body and the conductive pattern includes coating an activating solution containing ions of the catalytic metal to deposit the catalytic metal by an oxidation reduction reaction. Column 2, lines 45-65 (note the palladium chloride and hydrochloric acid used, which will have the claimed reaction).

Claim 7: the catalytic metal is palladium. Column 2, lines 45-65. The metal formed by electroless plating can be a nickel layer. Column 3, line 55 through column 4, line 5.

Zeller teaches all the features of these claims except that (1) the conductive pattern includes electrodes to be used with connection pads, (2) the space portion between the electrodes has a plurality of different values, (3) that the oxidizing agent is coated selectively so that the oxidizing agent is formed selectively on all parts of the

space portion which are smaller than 30 microns, out of the space portion between the electrodes, to prevent short circuits.

The admitted state of the prior art teaches that when forming wiring substrates with conductive patterns, it is well known for the wiring patterns to include electrodes formed of copper which then are overplated to enhance reliability, and the electrodes form connections to the electronic parts. See paragraphs [0002]—[0008] of the specification. It is also well known for the pitch of the copper electrodes on the wiring substrate to be narrowed to 60 microns or less, and that short circuit problems occur when plating, with such narrowed spaces present. See paragraphs [0002]—0008] of the specification. It is also well known for the space portions between the copper electrodes to vary over the substrate. See paragraph [0006] of the specification. It is also well known to desire to form a nickel layer selectively on the copper electrodes by electroless plating. See paragraphs [0002]—[0008] of the specification. This electroless plating provides plating without using solder resist. See paragraphs [0002]—[0008] of the specification.

McCormack teaches that when electroless plating a substrate, it is known to be desired to only coat certain areas of a substrate. Column 1, lines 10-20 and 30-45. McCormack teaches that to provide such selective coating, it is known to first treat the entire substrate (base) with a catalyst material, such as palladium to render the substrate senstitive to the reception of electroless plating. Column 5, lines 30-45. Then a "poison" material that deactivates the catalyst (neutralizes, lowers catalytic activity) is

applied to limited selected areas of the based material, such as by printing or silk screen stenciling. Column 5, lines 30-45 and column 2, lines 15-35. Thereafter, the base is contacted with an electroless metal deposition solution to deposit electroless metal deposition solution to deposit electroless metal on the sensitized areas not coated with the "poison" containing material. Column 5, lines 30-45. The poisons can include sulfur, used in elemental or compound form. Column 2, lines 25-35. The poisons can be dissolved in appropriate solvent, such as water, and applied. Column 3, lines 1-10 and 48-50.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to (1) (2) modify Zeller to provide that the conductive pattern includes electrodes spaced different distances apart and that these electrodes can be less than 60 microns apart as suggested by the admitted state of the prior art in order to provide a desirable circuit and microelectronic pattern because Zeller teaches forming conductive patterns on insulating substrates for integrated circuits, and the admitted state of the prior art teaches that conductive patterns on wiring substrates for such purposes conventionally have copper electrodes spaced different distances apart and that the electrodes can be less than 60 microns apart. It further would have been obvious to perform routine experimentation to optimize the distance apart to less than 30 microns apart in at least some cases as the admitted state of the prior art provides that less than 60 microns apart is conventional, and 30 microns is included in the range of less than 60 microns. As to the electrodes being on which connection pads of an

electronic part are connected, the admitted state of the prior art teaches that the electrodes are used to provide connection to the electronic parts, and thus would connect with connecting devices or "pads" on the electronic parts. (3) It further would have been obvious to modify Zeller in view of the admitted state of the prior art to apply the oxidizing agent selectively to the non electrode "space" portion, including all the parts of the space portion of less than 30 microns apart, as suggested by McCormack, in order to prevent plating in the unwanted areas between the electrodes, because Zeller teaches that it is desired to deactivate catalytic coating on the insulating surface (i.e. the spaces between conductors) to prevent plating and resulting short circuits and the admitted state of the art teaches that a particular problem with such plating occurs in narrowed spaces, which are less than 60 microns apart (which would be inclusive of less than 30 microns apart); and McCormack teaches that a deactivating poison material can desirably be applied specifically to areas where plating is not desired by a selective coating process such as printing. By printing selectively in the areas desired not to have any plating, the amount of material used can beneficially be reduced.

9. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zeller in view of the admitted state of the prior art and McCormack as applied to claims 1, 4 and 7 above, and further in view of Miller (US 4668533).

Zeller in view of the admitted state of the prior art and McCormack teaches all the features of this claim except ink jet printing the oxidizing agent.

However, Miller teaches ink jet printing as a well known printing method to apply materials for electroless plating in a selective form, such as sensitizers and activators. Column 2, lines 40-50, column 3, lines 45-60 and column 4, lines 15-30. The substrate can be an active integrated circuit. Column 3, lines 25-35.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Zeller in view of the admitted state of the prior art and McCormack to apply the oxidizing agent selectively by ink jet printing as suggested by Miller with an expectation of desirable printing results, as McCormack teaches that selective application of deactivating material can be by printing, and Miller teaches a well known printing method for selective application of materials for electroless plating is by ink jet printing.

10. Sugama (US 4927462) notes that sodium hydroxide is a known oxidation agent. Column 3, lines 20-35.

11. The Examiner notes that McCormack et al (US 3443988) is identified as SCHNEBLE, FREDRICK W JR; et al on the PTO-892 form.

Response to Arguments

12. Applicant's arguments with respect to claims 1, 3, 4, 7 and 10 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Katherine A. Bareford whose telephone number is (571) 272-1413. The examiner can normally be reached on M-F(6:00-3:30) First Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy H. Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Katherine A. Bareford/
Primary Examiner, Art Unit 1792